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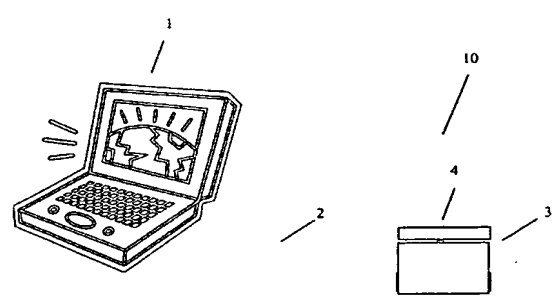
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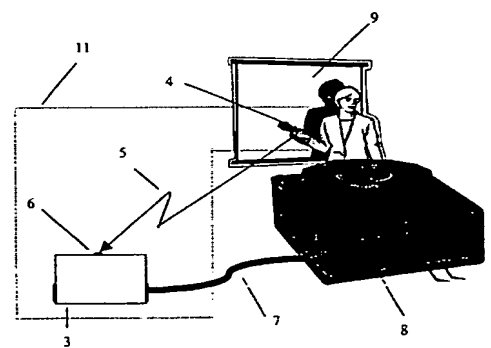
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(54) Title: ELECTRONIC PRESENTATION SYSTEM USING PORTABLE STORAGE DEVICE IN PLACE OF A PERSONAL COMPUTER



(57) Abstract: A method of facilitating electronic presentations using a portable storage device (3) in place of a personal computer to generate an array of images for display on an electronic display system (8) such as an LCD projector. A laptop computer is typically employed to generate a series of electronic slides as part of a presentation to an audience. A smaller, simpler, more robust device may be employed to accomplish the same task increasing both convenience to the presenter and reliability. The system includes a device (3) that receives and stores presentation images from a personal computer prior to the presentation. At the time of presentation, the device is connected to a display device (8) such as an overhead LCD projection system via a standard video interface, such as a VGA port.



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# **ELECTRONIC PRESENTATION SYSTEM USING PORTABLE STORAGE DEVICE IN PLACE OF A PERSONAL COMPUTER**

## **RELATED APPLICATIONS**

This application claims priority from U.S. Provisional Patent Applications each entitled "Electronic Presentation System Using Portable Storage Device In Place Of A Personal Computer" having Application Nos. 60/214,064, 60/232,595, 60/265,148 and 60/273,815, which were respectively filed on June 26, 2000, September 14, 2000, January 29, 2001 and March 6, 2001. Each of the above applications and their disclosures are incorporated herein by reference for all purposes.

## **BACKGROUND OF THE INVENTION**

### **Field of the Invention**

The present invention relates generally to the electronic presentation of information, and more specifically to a electronic presentation system and apparatus for storing and selecting viewable images to an audience.

### **Description of the Prior Art**

Electronic overhead projection technology is a rapidly growing area and its application is becoming increasingly common in the conference room setting. For example, such technology is replacing the ubiquitously cumbersome viewgraph projector, which shines a light through hand drawn or computer printed transparencies to focus an image on a projection screen. Portability of the conventional presentation technology is a beneficial aspect of the viewgraph projector. The presenter may prepare his or her slides prior to the meeting possibly using a personal computer with the aid of a presentation program such as Microsoft PowerPoint.™ The hardcopy slides may then be printed and carried as a small package to the meeting for use in the presentation.

A conventional approach to providing for electronic presentation is to use software or hardware systems to remotely control a traditional slide advance mechanism. Such techniques include methods for remotely advancing the slide by wireless means.

Another approach provides for remote control of an electronic slide presentation using a personal computer supporting a graphical user interface. The presenter uses the system to send wireless commands to a display generator, where the display generator contains a copy of the presentation images.

A drawback of conventional electronic overhead projection technology is that it has become necessary to carry a personal computer to the meeting in order to provide video signals to an overhead display device. Even with newer lightweight laptop computers, such devices are expensive, fragile, and bulky, thus inconveniencing a presenter bringing such a device to a meeting.

Another drawback requires the presenter now to deal with locating an outlet for supplying power to the laptop as well as arranging and connecting necessary wires and cables. Such a drawback commonly delays the start of a presentation while the presenter struggles to get the computer started, figure out how to get the video output on the laptop enabled, find his or her presentation file, and start up the display program.

A further drawback to traditional electronic overhead projection technology is that the presenter's private files and directory listings are exposed to the audience for viewing. Yet another disadvantage is that once the presentation is underway, it is not uncommon to have it interrupted with the laptop's screen saver or energy saver mechanisms that turn-off the computer and its display.

Therefore, there is a need to overcome the drawbacks of the above traditional approaches and to provide a more portable electronic presentation system.

## SUMMARY OF THE INVENTION

The present invention includes a method, an apparatus, and a system for providing effective electronic presentations. Unlike the prior art, the present invention provides a portable device that may be carried to meetings and connected to an electronic display without hindering the presenter with the need to operate a cumbersome laptop or personal computer at that presentation. For example, the method includes the following steps. A database of images is stored on a first storage medium such as a PowerPoint™ presentation stored on the hard drive of a laptop computer. The images in this database are

transferred to a second storage medium such as a solid state memory or a miniature hard drive in a portable device. The portable device is then taken to the site of the presentation and connected to the electronic display by means of a standard video interface such as a VGA connector.

5           The presenter selects images to be displayed using a hand-held remote control unit. The portable device receives commands from the remote control and recovers the appropriate stored image from its memory and generates a video display output on the standard video interface thereby placing the desired image on the screen of the electronic display. The remote control allows sequencing forward and backward through stored images,  
10 jumping back and forward to book-marked images, and display of an array of thumbnail images for fast selection of a desired image from the full set or a subset of book-marked images. The controller also allows the addition or removal of bookmark designations during a presentation. The remote control further allows the presenter to preview slides prior to their display to the audience.

15           A system for giving electronic presentations according to the present invention includes a display generator, such as an LCD display device. a storage medium having encoded presentation images, a display controller, such as a control module, a video output generator, whereby the output video is intended to drive a display device suitable for viewing by an audience, and a communications controller. The system also includes a remote control  
20 unit including a memory for encoding preview images or replicas that corresponding to the presentation images. Also included is a preview display, such as a user interface, that allows a user to see one or more of the preview images or replicas prior to or simultaneous with the display of a corresponding one of the presentation images to an audience by means of the display generation means. One or more user inputs allow the user to specify the display of  
25 the presentation images associated with the preview images. A communications module is included to transmit data to the communication controller, thereby allowing the remote control unit to influence the operation of the display device.

          The system includes an apparatus is able to playback recorded presentations in a way that is comparable to running the original presentation application on a computer. It  
30 has the advantage of not requiring the original presentation application to be in operation, thereby possibly reducing the cost, complexity, and/or power requirements of the playback device's hardware and software. A small form factor that increases the portability of the

device. Distinguishing characteristics of this include elimination of the keyboard, mouse, and large format display screen associated with laptop computer

Other features and advantages of the present invention will be understood upon reading and understanding the description of the specific embodiments found

5 hereinbelow, in conjunction with reference to the drawings, in which like numerals represent like elements.

## BRIEF DESCRIPTION OF THE DRAWINGS

10 Figure 1 schematically illustrates a system for capturing presentation images from a personal computer into a small storage device and then later recovering the stored images from the device as input to an electronic display;

Figure 2 schematically illustrates one embodiment of the present invention that digitizes a standard analog video signal from a personal computer and stores those screen  
15 images;

Figure 3 is similar to Figure 2 but a digital input is taken from the personal computer;

Figure 4 is similar to Figure 3 but a removable memory device is employed for transferring and storing screen images;

20 Figure 5 illustrates a package design following the architecture of Figure 4;

Figure 6 illustrates an alternative embodiment for a remote controller which incorporates an LCD display for previewing slides prior to their presentation to the audience, a touch panel which may be used for directing a pointer on the display seen by the audience, and buttons arranged for controlling the preview display separately from the control of the  
25 display seen by the audience; and

Figure 7 illustrates pointer sensitive control regions on a generated display that allow pointer position to be used to enhance the meaning of a small number of buttons on a remote control having the capability to move a pointer on the display.

## 30 DESCRIPTION OF SPECIFIC EXEMPLARY EMBODIMENTS

The specific details disclosed herein are not to be interpreted as limiting, but rather as a basis for the claims and as a representative basis for teaching one skilled in the art

to employ the present invention in virtually any appropriately detailed system, structure or manner.

In accordance with the present invention, an exemplary electronic presentation system for facilitating a presentation of information to an audience is described with reference to Fig. 1. An exemplary apparatus for providing information to effect electronic presentation in accordance with the present invention is discussed in connection with Figs. 2-4. An exemplary apparatus for controlling the electronic presentation in accordance with the present invention is described in Figs. 5-7. Although the following discussion is in the context of electronic presentation of visual images, it should be understood that any type of information or data might be presented to an audience, such as animated images, auditory sounds (e.g., music), etc.

Fig. 1 depicts an exemplary electronic presentation system 10 including a control unit 4 and a portable storage device 3. System 10 is configured to electrically couple to a computing device 1 via a communication channel 2. Computing device 1 is preferably a personal computer. System 10 is also configured to electrically couple to a presentation device 8 via a communication channel 7. Presentation device 8 is preferably a display device, such as an LCD projector or the like.

In general, computer device 1 is illustrative of but one type of computer system, such as a laptop computer, suitable for use with the present invention. Computers can be configured with many different hardware components and can be made in many dimensions and styles (e.g., palmtop, pentop, server, workstation, mainframe, or the like). Note that the use of the term "computer device" includes any device or platform configured to process information such as a cellular telephone, etc. Computers and computing devices described herein include wireless telephones and any other electronic device having the ability to process and communicate information. Any hardware platform (i.e., CPU, operating system, application program, etc.) suitable for performing the processing described herein is suitable for use with the present invention. Personal computer 1 is designed to operate by any operating system, such as Microsoft Windows 98 operating system, Linux operating system, Windows NT operating system, or the like.

In operation, personal computer 1 is preferably used to author a presentation, such as a collection of one or more images, where each of the images are associated with a file containing digital representations of the images. The presentation's associated file and file format is designed to be stored upon computer-readable media, such as a hard drive. In one embodiment, the images are stored in a standard file format for presentations such as

Microsoft's Power Point file format. In this case, the display generation mechanism, such as display device 8, will incorporate software, hardware, or a combination thereof to produce the desired images from the standard file format. One having ordinary skill should appreciate that storing such images as digital files is well known in the art

5 In one embodiment, the image data is compressed for storage using compression techniques and retrieved using decompression techniques known in the art. Compressed image data allows more efficient use of memory and thereby allows for a smaller-capacity memory device such as described further in connection with discussion regarding portable storage device 3. Such memory devices or units are used to provide data  
10 storage of a complete presentation (i.e., collection of image files). Fairly large levels of compression are possible, especially for presentation images that include text and uniform backgrounds. If compression is used, one embodiment of display device 8 is configured to include decompression capability, whether provided by hardware and/ or software, for decompressing compressed image data. Portable storage device 3, however, may also  
15 provide for decompression prior to transmission of an image to display device 8.

In one embodiment, system 10 is configured to accept encapsulated fonts with a presentation file containing images from personal computer 1. Since display device 8 might not be configured to decode all the fonts used in a presentation, the present invention provides for a presentation file format that incorporates a set of fonts with a presentation file  
20 prior to transmission to display device 8. The encapsulate fonts allow display device 8 to decode all the fonts that are called out in a given presentation file as generated by conventional computing devices. In one embodiment, computer 1 uses proprietary software to construct a composite file including, for example, a PowerPoint presentation file and additional fonts that are not included in the list of standard fonts available on display device  
25 8. In this case, when the composite file is opened on display device 8, the added font files are installed in an appropriate directory for the PowerPoint Player or a control module to use.

Upon completing the creation of a presentation, personal computer 1 is sequence through the desired presentation images, either manually by a user or under software control. Portable storage device 3 is then instructed to store (i.e., capture) each of  
30 them into its memory by a command transmitted either through communication channel 2 (e.g., from the personal computer) or through the control unit 4, which may be configured as a control panel on portable storage device 3. The images are stored in portable storage device 3 for later use in a presentation where the presence of the original personal computer 1 will no longer be required.



Figure 1 further shows exemplary portable storage device 3 configured to operate according to the present invention. At a presentation site, system 11 is connected to display device 8 via communication channel 7. In one embodiment, communication channel 7 includes a standard video interface (not shown), such as a VGA port, coupled between system 11 and display device 8, such as an LCD projector. Portable storage device 3 functions to play back and present images to display device 8 upon command. In turn, display device 8 operates to illuminate screen 9, for example, to present visual images to an audience.

In one embodiment, these commands are received by a wireless communication system 5 from control unit 4 (i.e. a hand held transmitter). In the embodiment the wireless communications is a radio signal, an acoustical signal (including voice-activated commands), an infrared signal (IR), or any other communication medium known in the art. In a specific embodiment, the communication means includes verbally-activated commands. For example, the phrase "in the next slide" activates the display of a next images, the phrase "referring back to slide X" activates the display of an already presented slide by jumping by to slide X, etc. Such phrases may be worked into a presentation such that when a presenter desires to display a next slide, the verbal command may be transparently incorporated in the presentation. In another embodiment, the commands are entered via direct means (i.e., manually) such as by depressing keys on portable storage device 3 or from a control unit 4 configured as a control box, where the control box is connected by wire to portable storage device 3.

As is known in the art of wireless communications, a device using wireless communications may be configured to communicate electrical information, such as a computer data signal comprising data (e.g., binary data bits) superimposed upon a radio or any other carrier wave. A person having ordinary skill in the art would appreciate that a carrier wave is electromagnetic energy propagated from a source by radiation, optical or conduction waves. Such carrier waves are suitable for embodying an information-bearing signal, such as a computer data signal. In one embodiment, a carrier wave behaves, or is modulated, according to a wireless protocol, such as Bluetooth, or any other communication protocol, so as to include computer data information. The carrier wave can be, for example, a direct current, an alternating current, or a pulse chain. In modulation of the carrier wave, it may be processed in such a way that its amplitude, frequency, or some other property varies so as to embody data for transmission of the computer data signal.

As depicted as system 11 of Fig. 1, and according to one embodiment, the control unit 4 is detachable from the main body of portable storage device 3. Portable storage device 3 then may be used to control the display in either the attached position (i.e., operating as a control panel) or detached configuration (i.e., operating as a remote control unit). The main body of portable storage device 3 may also incorporate an LCD display and a touch pad as an output and an input device, respectively, for operating portable storage device 3.

In one embodiment, control unit 4 is configured as a hand-held device may provide further organizational display assistance to the presenter. For example, organizational assistance may take the form of allowing the presenter to skip forward or backward through previously book-marked images associated with files comprising such images. Exemplary organizational display assistance is a user interface that allows the presenter to display, to the presenter, an array of thumbnail images of each image stored in portable storage device 3. Also available to the presenter is an array of a subset of those images such as all of the book-marked images. Arrow keys on control unit 4 may then be used to select a desired image for display by either sequentially presenting images or jumping to a selected images by using, for example, book-marked images in the presentation sequence. A hand-held control unit 4 also provides for making book-marks on selected slides or images during or before the presentation to allow easy return to images of interest. Making such book-marks include depressing a button on control unit 4 and associating an image with a book-mark, where the book-mark is an iconic representation of the association between the book-mark and the book-marked image.

According to the present invention, communication channels 2 and 7 may be standard cables used to couple computing devices to peripheral equipment. Furthermore, for example, communication channel 2 is coupled to personal computer 1's parallel port. In another embodiment, communication channel 2 is coupled to computer 1's serial port. In yet another embodiment, the communication channel 2 is coupled to computer 1's VGA output port. In still yet another embodiment, communication channel 2 is a wireless propagated signal embodied in a carrier wave. In this case, channel 2 is configured in accordance to communication standards known in the art. Similar configurations apply to communication channel 7. It is also within the scope of the present invention to employ network systems, such as WAN, LAN, Internet, etc., to provide for communication channels 2 and 7.

In accordance with the present invention, an exemplary apparatus for providing information to effect electronic presentation is discussed in connection with Figs. 2-4. One example of an apparatus according to the present invention is shown in Fig. 2.

Portable storage device 20 is an apparatus used to, among other things, replace personal computer 1 of Fig. 1, provide storage for images to be displayed, control the display of images upon command, etc. Portable storage device 20 includes control module 25 and memory 27. A person having ordinary skill in the art should appreciate that control module 25 might comprise hardware, software or a combination thereof. For example, control module 25 might be a central processing unit ("CPU") where the CPU might be an Intel CPU, a PowerPC, or the like, wherein the control module is designed to receive instructions (i.e., commands) and data for managing processes of portable storage device 20. Control module is coupled to each of the other elements of portable storage device 20 via a bus (not shown), for example. The use of a bus allows each of the elements, or subsystems, to transfer data among subsystems as well as external devices via an interface.

Fig. 2 illustrates a first embodiment of portable storage device 20. In association with portable storage device 20, the image data is received as an analog video stream (i.e., analog data signal including image data) over a standard interface 21, such as a VGA connector. The signal containing the image data is digitized at video input digitizer 26 and stored into a designated location in memory 27 under the control of a control module 25. Control module 25 also monitors incoming wireless commands 22 received via the communications sensor 23 and communications controller 24. Memory 27 is designed to be of sufficient capacity to allow storage of a typical presentation. The preferred storage technology is a non-volatile solid-state memory (e.g., Flash, SRAM, etc.), a hard drive, or any like suitable storage. In one embodiment, memory 27 includes a resident memory designed to contain an operating system for controlling operations of portable storage device 20. Such a resident memory also includes one or more application programs, such as Microsoft's PowerPoint, for presenting the images.

In operation, after all desired presentation images have been stored into memory 27, portable storage device 20 is detached from personal computer 1 of Fig. 1 and transported to the location of a presentation where it is then attached or coupled to display device 8 of Fig. 1 via digital output port 30 of Fig. 2. When a command is received by communications controller 24 to update the display with a new image, the indicated image stored in memory 27 is sequentially read or fetched from memory 27. Alternatively, the stored images are selectively fetched from memory 27 as determined by control module 25 (e.g., upon command for a specific image to be displayed). Under control of control module 25, the read image is transferred to video output generator 28, which produces a continuously refreshed output video raster on output port 30. In the embodiment, an internal power supply

29 is couple to substantially all sub-systems of portable storage device 20 and allows operation for extended periods without connection to external power. Such internal power supplies 29 include a Nickel-Cadmium battery, or any type of battery or power storage means known in the art.

5 Fig. 3 depicts another embodiment of portable storage device 40. According to this embodiment, the image data is received as a digital sequence of data (i.e., digitized image) over a standard interface 41. An exemplary interface 41 might be a parallel port, a serial port, a USB port, or the like. The image data is stored into one or more designated locations in the memory 47, where each location is related to an image and its file. Internal  
10 memory 47 is of sufficient capacity to allow storage of a typical presentation. The preferred storage technology is a non-volatile solid-state memory (e.g., Flash, SRAM, etc.) or a miniature hard drive.

In operation, after all desired presentation images have been stored into memory 47, portable storage device 40 may be detached from the personal computer and  
15 attached or electrically coupled to display device 8 of Fig. 1 via digital output port 50. Control module 45 functions to monitor incoming wireless commands 42 received over the communications sensor 43 and via communications controller 44. Upon receiving a command to select and update the display with a new image via communications controller 44, control module 45 selects an image stored in the memory 47 which is associated with the  
20 command, reads the image data (i.e., file) from memory 47, and then transfer the image data to video output generator 48. Output generator 48 produces a continuously refreshed output video raster on output port 50. Such internal power supplies 49 include a Nickel-Cadmium battery or any type of battery, or power storage means known in the art.

Fig. 4 illustrates yet another embodiment of portable storage device 60 in  
25 accordance to the present invention. In this embodiment, under control of a software program, personal computer 1 of Fig. 1 functions to capture the desired images and stores them into a removable storage device 61, such as a PCMCIA memory card, a magnetic recording media, or any other storage medium. In this embodiment of portable display device 60, removable storage device 61 is a removable memory module that serves as  
30 communication channel 2. Optionally, the removable memory module may be used also to store the appropriate application software for doing a capture of one or more images onto the removable memory module.

When all the desired presentation images have been captured and stored onto the removable storage device 61, removable storage device 61 is removed from personal

computer 1. In operation, removable storage device 61 is then inserted into or connected with the portable storage device 60, as shown in figure 4, and thus operates as a to store presentation images during a presentation similar to internal memories 26 and 46 of Figs. 2 and 3. When a command 62 is received by communications controller 64 to selectively  
5 update the display with a new image, the indicated image stored in removable storage device 61 is selectively read (e.g., sequentially read) under control of control module 65. Control module 65 then controls the transfer of the image from removable storage device 61 to video output generator 66. Output generator 66 is designed to produce a continuously refreshed output video raster on output port 68. In the embodiment an internal power supply 69 allows  
10 operation for extended periods without connection to external power, as similarly described herein.

In an alternative embodiment, exemplary portable storage device is configured to generate a summary of one or more presentation displays showing the contents of memories 27, 47, and/ or 61 of portable storage devices 20, 40, and/ or 60, respectively.  
15 Such summaries are presented to a presenter are generated upon a command to do so. A command to create a summary is entered, for example, via a control panel on the portable storage device, or by using a unit controller. The control module receives the command and in response, scans the memory or file directory. Thereafter the control module presents a summary of the memory contents to the presenter using a user interface, such as an LCD.  
20 The summary, for example, may be presented as a composite image of small thumbnail images that are associated with the stored images. In one embodiment, the composite image is a mosaic with M by N thumbnails shown on a user interface or display. Such an image is formed by presenting to the presenter an array of thumbnails, whereby M and N are integers that depend on the size of the thumbnails. The full set of thumbnail images comprising the  
25 presentation may be viewed through the use of scrolling commands.

Another embodiment of the portable storage device according to the present invention is a digital camera which includes similar functional elements of an embodiment of the present invention, regardless of whether the camera produces video and/ or just static images. Digital cameras employ a large memory storage device for images and typically  
30 have include input and output connectors for transferring data between that memory and a computer. More specifically, this embodiment is a digital camera having a high-resolution video output generator, a presentation module and a communication module. The video output generator is configured to accept internal video signal as conventionally used to record or playback video images. The output generator is further configured to generate and output

a high-resolution output of the video, such as in XGA format. The video output generator in a digital camera functions similarly as other video output generators taught in the other embodiments.

The communications module includes hardware and/ or software configured to receive and transmit information. For example, an exemplary control unit for sequencing, remotely, through images and navigating through a presentation using arrays of thumbnail images, as taught in the other embodiments. The presentation module includes hardware and/ or software configured to control the digital camera in an electronic presentation application as taught in taught in the other embodiments. In one embodiment, the presentation module performs similar functions as the control module of the portable storage device as described herein. For example, the presentation module operates to receive instructions from the communication module, such as a "next slide" command. Upon receiving such a command, the presentation module accesses the resident memory of the digital camera to fetch data representing the "next slide." The image data is provided to the digital camera's video output generator. The video signal from the video output generator is then provided to a display device for viewing by an audience.

In an application according to the present invention, the digital camera may be connected to a computer having capture computer program used to generate a data file of images for the prepared presentation which are downloaded into the camera's memory. In one case, images are transferred first from the camera to the computer for integration into the presentation sequence, in any position of presentation. Then, the images are transferred back to the camera as a member of that sequence. The camera may then be taken to the presentation where it is connected to the electronic display for viewing by an audience. Controls on the camera or a remote control unit are used to select or sequence through the images as in other previously discussed embodiments.

Thus, a digital camera according to the present invention includes functionality of a computer grade (i.e., high-resolution graphics ) video output and a communication means, such as a remote control unit. The remote control unit is used to sequence through images and navigating using arrays of thumbnail images as taught in the other embodiments.

According to another embodiment of the present invention, portable storage device 3 operates, in part, as a digital recording and playback device, and has at least some similar functionality and structure as a digital VCR (e.g., such as the DSR-20 Digital Videocassette Recorder manufactured by Sony, Inc. or any other compact digital VCR), or

other suitable equivalent digital recording device. In this embodiment, however, portable storage device 3 includes a recording module for recording audio and/ or video signals. The recording module in this embodiment is configured to receive a video signal from a personal computer or other computing device. In operation, the recording module receives either an analog video signal or a digitally formatted signal such as might be captured to a file by a screen capture application. Such a screen capture application may reside in the memory within portable storage device 3.

To create images for presentation according to this embodiment, an image is stored in a digital VCR tape format by parsing a presentation into individual slides (i.e., non-animated) and recording the slides, for example. When a presentation is to include animation or video clips where transitions from one slide to the next occur, such images are generated by using a capture program on a personal computer. The personal computer may monitor the display while waiting for a change and when such a change occurs, the capture program generates a new snapshot of the screen. This capture program may be enhanced by attempting to detect transition animations and recording them as well. Similarly for included video clips. The capture program is configured to generate a data file that is transferred to the portable storage device. Thus, an apparatus according to this embodiment does not require proprietary presentation software that runs on a personal computer, such as PowerPoint.

Also included in portable storage device 3 is a transition detector that operates to detect static displays between transitions from one image to a next image. The purpose of this capability is to determine how far video playback should proceed when the user clicks the next slide (i.e., image) button on the remote without transitioning to a next image. In an exemplary implementation of the transition detector according to the present invention detects segments in the video sequence, where a measure of change is below a suitable threshold. For example, one (of many possible) criterion for detecting static image transition points may detect such a point during a sequence of more than 30 frames (one second of video), wherein the image does not exhibit any perceptible change. In the case of using digital screen capture, an indication of "no change" corresponds to no change in the digital values. In the case where the input video source is analog, such as XGA, an indication of "no change" is taken to mean no significant change above, for example, the noise floor of the analog to digital converter employed.

Further included in portable storage device 3 is a playback module that is configured to provide video sequences between the static transitions, as described above,

wherein the playback module stops substantially at each transition point and holds a static display until the user activates the control module to request another playback action. Thus, the playback module allows, among other things, to sequence through a recorded PowerPoint presentation that includes animated transitions between slides as well as inserted video clips.

5 The recording and playback module may be implemented in hardware and/ or software.

An exemplary apparatus for controlling the electronic presentation in accordance with the present invention is described in Figs. 5-7. One example of such an apparatus according to the present invention is shown in Fig. 5. Control unit 80 is an apparatus used to, among other things, to provide control signals selected by a user (i.e.,  
10 presenter) to, for example, portable storage device 81 such that the user is able to select images to be displayed upon command.

Fig. 5 illustrates system 79 having a control unit 80 that includes at least a control unit manager module (not shown) and a memory (not shown). A person having ordinary skill in the art should appreciate that control unit 80 might comprise hardware,  
15 software or a combination thereof. For example, the control unit manager module might be a central processing unit ("CPU") where the CPU might be an Intel CPU, a PowerPC, a micro-controller, or the like, wherein the control unit manager module is designed to receive instructions (e.g., commands via user inputs of control unit 80) and data for managing processes of controlling the presentation of images. The control unit manager module is  
20 coupled to each of the other elements of control unit 80 via a bus (not shown), for example. The use of a bus allows each of the elements (e.g., user input such as a button) or subsystems, to transfer data among subsystems as well as external devices via an interface. The control unit manager module of control unit 80 is also coupled to a communications module for generating, among other things, a wireless signal to transmit commands to the portable  
25 storage device.

Control unit 80 may receive images and thumbnail images by a wireless link during a presentation. Alternatively, control unit 80 may be preloaded with images prior to the presentation such that each preloaded image is synchronized with an image to be presented by the display device. For example, for each image selected to be displayed, a  
30 unique image ID is transmitted to portable storage device 81 for presentation. In one embodiment, the images are preloaded over a wired link or a wireless link, such as an infrared link supported by control unit 80 and portable storage unit 81.

As shown in Fig. 5, one embodiment of the wireless control unit 80 is configured to couple to portable storage device 81. Such a coupling provides a mechanical



attachment and an electrical coupling, such as a cradle known in the art related to PDA (personal digital assistance) to transport system 79 and optionally use as a single unit. In this example, the embodiment with a removable memory module 82 is shown. The video output is provided to, for example, a VGA connector 84 by an attached cable 83.

5 Control unit 80 operates to generate one or more control signals to be received by any of the embodiments of the portable storage devices 20, 40, 60, as described above, or the embodiment of the portable storage device 81 shown in Fig. 5. Exemplary control unit 80 has a plurality of user input means 85, 86, 87, 88, 89, 90 that allow a presenter to provide image selections to the portable storage device 81. In one embodiment, control unit 80 also  
10 includes a microphone to accept verbal commands. Such verbal commands are decoded by the control unit manager module of control unit 80 and transmits such commands as a signal, preferably an infrared link. According to the present invention, control unit 80 need only recognize a few phrases to effect a presentation (e.g., next slide, last slide, jump over to slide X, jump back to slide X, etc.). Thus, complex voice recognition algorithms or programs are  
15 not required.

Examples of these selections include next slide (i.e., image), previous slide, next book-marked slide, previous book-marked slide, assign a bookmark to the present slide, turn off display, turn on display, display a menu, move up or down on a menu, select a menu item, display an array of thumbnail images, move up down left or right on an array of  
20 thumbnail images, and select a thumbnail image from an array of thumbnail images, display selected thumbnail image, and other like functions. Any of these function may be activated by physical means, by verbal means, etc. User input 90 may be configured to operate as a pointer, as described below.

In one embodiment, these functions are accomplished with user inputs, where  
25 the user inputs are designed as a small number of buttons that are arranged logically so as to be easily used in the dark by feel alone. In another embodiment, the number of buttons are illuminated or include glow-in-the-dark materials. For example, the buttons may be given tactile signatures so that the primary ones, such as 85 and 87, may be easily found by the presenter's finger or thumb while holding control unit 80 with one hand.

30 One or more buttons may be reused in different modes and thus each button may provide for more than one appropriate function. For example, 86 and 88 may be used to go to the previous or next book-marked image when viewing an image. The same button may be used for cursor up or down commands when viewing an array of thumbnail images. In a like manner, one embodiment employs the central key 89, as a menu select key when

viewing a normal image and as a select key when viewing a menu or an array of thumbnails. A menu displayed on a user interface allows selection of other modes and for adding or removing bookmarks. In one embodiment, a central key 89 acts like an escape key in conjunction with some of the other keys to allow quick access to commonly used functions  
5 such as book-marking the currently displayed image.

Fig. 6 shows exemplary wireless control unit 91 according to another embodiment, where control unit 91 includes a user interface or display 92. User interface 92 may be used to show the presenter a preview of the image or slide that will appear when next slide button 97 is depressed. User interface 92 may be of reduced resolution, sufficient only  
10 to give the presenter a reminder of the upcoming slide. In many cases, only a coarse image of the slide will serve as a useful reminder. One having ordinary skilled in the art should recognize that image processing techniques, such as low-pass and band-pass filtering, may be employed to improve the distinctiveness of such reduced resolution displays in this kind of application. In one embodiment, user interface 92 is active so that it may be viewed easily in  
15 a darkened room.

Exemplary buttons 96 and 97 are the forward and back controls, respectively, for the slide presentation viewed by the audience. User interface 92 is updated to show a preview of the slide that will appear to the audience when forward button 97 is pressed. Exemplary buttons 94 and 95 allow the user to privately preview the slides in the presentation  
20 without showing them to the audience. Pressing forward button 95 advances the preview display through successive next slides but does not change the slide being displayed by portable storage device 81. Similarly, reverse button 94 sequences the preview through prior slides in the presentation, by using user interface 92, without affecting the display seen by the audience. At any point in time, pressing forward button 97 will change the slide seen by the  
25 audience to be the one currently on the preview display on user interface 92. Button 98 may be used to toggle bookmarks, to escape to other menu options depending on the number of presses, or any other configurable function selected by the presenter.

Control unit 91 includes control buttons on the front face of the unit. They may also be placed on the grip edges 77 of control unit 91. In either case, one embodiment  
30 positions the buttons to foster one-handed operation. Software configuration of the button assignments may be done to accommodate left or right handed user preferences or other suitable functions.

The previewed image data shown on user interface 92 may be transmitted on demand by a wireless means or a cable to control unit 91 or when the presented images

require updating. Since previewed images of user interface 92 are intended only as previews to assist the presenter in anticipating what will come next, it is not necessary to provide high resolution or animation effects on the preview display. The required image data may be preloaded into control unit 91 prior to the giving of a presentation while the controller is  
5 cradled or otherwise attached to portable storage device 81 of Fig. 5. In this embodiment, the image data may be transmitted by direct wire connection and stored in a memory in control unit 91. With this embodiment, the wireless communication means between the controller and the portable storage device need only support a very low bandwidth since only button push data need be transmitted. Furthermore, although communication need only be in one  
10 direction, bi-communication is within the scope of the present invention.

In yet another embodiment of control unit 91, a user input and output device includes a touch panel 93, which may be used to direct a pointer on the display to be seen by the audience. In one embodiment, the pointer is only displayed when a finger, thumb, stylus, or like instrument is used to apply pressure to the touch pad. Touch pad 93 may be  
15 superimposed with user interface 92, or separate therefrom, as shown in Fig. 6.

User interface 92 may also be used to show notes, the current slide or image, the current time or elapsed time. In one embodiment, the display of time and progress through the presentation is indicated by graphical displays such as progress bars that indicate the percentage of the time allotted for the presentation on one progress bar, and the  
20 percentage of the presentation completed on another progress bar. The juxtaposition of these two progress graphics provides the presenter an immediate indication of whether the presentation is paced to finish on schedule. These progress displays may operate using defaults such as a standard one hour presentation and an equal time allotment to each slide. Under control of the control unit manager, the presenter may configure control unit 91 to  
25 allow the presenter to set the actual time allowed for the presentation and relative percentages of time allocated to each slide in the presentation. Control unit 91 may also provide a capability for viewing a graphical summary of the presentation so as to make it easier for a presenter to quickly locate and jump to a specific part of his or her presentation, which is capable of operating separately from the parent device (e.g., portable storage device).

30 Control unit 91 may be further configured to employ functions that are desirable for controlling the sequencing of slides during a presentation or in rehearsal prior to giving a presentation. For example, jumping to a book-marked image slide, switching to a different set of slides, and rearranging the order of slides.

A exemplary control unit according to still yet another embodiment of the present invention is a palm computer (not shown), such as a Palm Pilot™ or any other similar device. In a system in accordance to one embodiment, portable storage device, 20, 40, 60, as described above, or a personal computer are configured to store a presentation and generates  
5 a video signal which can be connected to a display device for an audience to see. This portable display device or personal computer is configured to receive commands from the palm computer indicating what to show on the public display. The palm computer, employed as a control unit, displays thumbnail images on its screen informing the user what image is coming next and allowing the user to preview slides in the presentation prior to selecting the  
0 ones for public display.

The palm computer may receive the thumbnail images by a wireless link during a presentation or it can be preloaded with images prior to the presentation. In one embodiment, the images are preloaded over either a wire or an infrared link supported by the particular palm computer device employed. An advantage of this embodiment is the  
5 convenience it affords the user in reducing the number of additional pieces of equipment required.

As previously described heretofore in embodiments, the control unit sends commands to a separate portable display device. The commands include specification of display transitions such as which slide to show next. The commands may also control the  
0 display and positioning of a pointer on the public display. The touch pad on most palm computers may be employed for controlling such pointer displays. The buttons typically found on palm computers may be used to control preview advance and reverse for displays shown on the palm computer's display. Additional buttons may be configured by the user to advance and reverse the display shown on the public display.

5 A palm computer used as a control unit typically includes a large display screen and thus may display several thumbnail images at a time. In one embodiment, the control unit displays several thumbnail images at a time with the current display centered between possibly some previous images and some images that follow the current one in the presentation order. Controls for selecting images and for performing an electronic  
10 presentation may either be on the touch sensitive screen or involve depressing physical buttons on the palm computer to allow selection of the next image to appear on the public display. In one embodiment, touching the thumbnail causes a command to be transmitted to the portable display device, which in turn, initiates a display of the selected image to the

audience. These controls also allow changing the mode of display on the control unit from showing several thumbnails together or a single image in greater detail.

Typical features of a palm computer naturally exhibit desirable control unit features. These features may be realized through a combination of software programming and/ or hardware augmentation. Under software and/ or hardware control, the palm computer provides the communications capability of the portable storage unit. Most palm computers provide electrical connectors to include additional electronic hardware, such as a serial data connector or an extension module slot. In most of these electronic hardware configurations, communications data and electrical power can be exchanged between the palm computer and a hardware extension module designed to enable a palm computer to implement the functions of the control unit of the present invention.

In this embodiment, a connection port on the portable storage device is provided whereby the palm computer may be connected for synchronization, upload and download of images or thumbnails, as similarly described above in connection with the presentation system. One embodiment of the portable storage device also includes a docking port (e.g., cradle) for a palm computer. This docking port can be designed so as to allow easy conversion to work with several different types of palm computer.

One embodiment also includes the ability to create macros (i.e., user computer programs) on the palm computer for automating the playback and control of the presentation stored within the portable storage device. The user has the advantage over current practice of being able to easily tailor the automation of a presentation to meet his or her needs.

In one embodiment of the control units and presentation system of the present invention include a mechanism to assign a "serial number" to the palm computing device to uniquely identify it within a group of devices. This serial number could be assigned during the synchronization process, or by a method where the user initiates a learning sequence at the portable storage device. This creates the advantage of allowing several presentations using similar devices to operate in proximity of each other without interference.

For certain palm computers that allow an optional expansion module to be attached, such as the HandSpring Visor™, one embodiment employs an expansion module with supplemental memory, a control module and a wireless communication sub-system. This expansion module thus enables efficient control of the portable storage unit, which generates the images shown to the audience, and facilitates storage and generation of preview images on the remote control implemented by the palm computer.

In another embodiment, the attached expansion module contains all the functionality of the portable storage unit, including processor, memory, video control, and drive electronics, and supplemental power supply. Specifically, this module could be an add-in module to a palm computer such as the HandSpring Visor product. In this design, the control unit and the portable storage unit would be combined such that the combined control unit-portable storage unit configuration may communicate wirelessly with the display device.

In one embodiment, which employs a palm computer, special techniques may be employed to improve the utility of the control unit that leverages the advantage of the properties of a palm computers display format. For example, different formats for showing preview images can be selected based on the variable size of the display screen and whether it is color or black and white.

A further enhancement of any of the above embodiments of the present invention adds a pointing means to the remote control. In a first embodiment, the pointing means is a conventional laser pointer. In a second embodiment, the pointing means employs an inertial sensing means to measure the translation or rotation of the remote control. This relative movement information obtained from the inertial sensors measuring such translation or rotation is transmitted to the portable storage device of the present invention (i.e., parent device) by a communication means, which is used to activate a pointer icon on the generated display. In a third embodiment, this pointing means is a touch pad on the remote control. This touch pad may be separate or superimposed with a user interface (i.e., private display) on the remote control unit, if one is present. The preferable communications mean is a wireless signal, but may include direct wire connection, radio signals, acoustical signals, infrared signals and the like.

An important feature of the inertial pointing means is that it actuates a displayed pointer in a two-dimensional manner that is relative to the body of the control device, where the displayed pointer is perceptible to an audience (at the option of the presenter). That is to say, a rightward motion (either rotationally or translationally) relative to the body of the controller and independent of the particular orientation of the control unit relative to the display screen will give rise to a rightward motion of the pointer icon on the generated display. Similarly, motions to the left or up or down relative to the body of the controller give rise to a corresponding motion with proportional magnitude of the displayed pointer icon. Various embodiments of the inertial pointing means may employ either translational or rotational inertial sensors or both. One embodiment includes a three-dimensional pointer used with a holographic-like presentation.

Another important feature of the inertial pointing means is that the pointer icon is activated by a button on the control unit, for example. When activated, the pointer icon is displayed starting at the last location at which it had been displayed. From this point, the pointer icon moves on the display according to the relative motion of the control unit body. That is, the presenter may move the displayed pointer icon by moving the entire control unit in two- or three-dimensional space. In some embodiments, the motion of the pointer may be smoothed so as to mask the revelation of any tremor in the user's hand. In addition to such active smoothing, it may be observed that the magnification of hand tremor exhibited by laser pointers may be averted with an inertial pointing means through the use of a lower gain factor when translating physical motion of the control unit to motion of the pointer icon on the display.

A third feature of the inertial pointing means is the use of a display boundary ("display bounds") of a user interface to limit the motion of the pointer icon. This prevents excessive motions of the remote control from causing the pointer icon to disappear from view, especially if the control unit's relative position in three-dimensional space affects the pointer's location. In one embodiment of the present invention, the appearance of the pointer icon is changed to make its location apparent to facilitate locating it. In another embodiment, the appearance of the pointer icon is changed when it is against a display boundary to cause it to cease to look like a pointer while continuing to keep it visible. For example, a pointer that appears as an arrow when it is away from the screen borders changes to a bright colored bar aligned with the proximal boarder when that pointer is pushed to the boarder of the display.

In one embodiment, the pointer ceases to be displayed when the pointer activation button is released, but the last displayed location is stored in memory and the pointer is redisplayed at that location when the activation button is next pressed. In a second embodiment, the pointer remains visible but ceases to move when the activation button is released.

Similarly, a pointing means based on a touch pad, a graphical user interface, or a combination thereof, may use the presence of finger or stylus pressure to activate a pointer icon on the display and later remove it from view when the pressure is removed. A lag time may be set to maintain the pointer display across intermittent contact with the touch pad. Appropriate trajectory calculations may be employed to enhance the appearance of the pointer movement that would otherwise be marred by, for example, a nervous finger.

In one embodiment, which includes a pointing means, many control functions are selectable using a small number of buttons on the remote control. To accomplish this the

pointer position on the screen is employed as a context for interpreting one or more button activations. For example, Fig. 7 illustrates that in a user interface according to the embodiments, the outer perimeter of the display 100 is divided into a number of regions 101-120. Each of these regions is associated with a control function.

5 To activate a particular function, the pointer 121 is positioned over the appropriate region 114 and a select button is pressed on the remote control. In order to make these sensitive areas easier for the user to learn, the regions are placed at the borders of the presentation display and the pointer is be moved over that location. Feedback about the presence of these regions may be provided by any of several means such as displaying an  
10 illuminated bar 114 as discussed earlier for helping to locate the pointer. For this purpose, this bar extends over the length of the selection region. The selection region remains fixed in position while the pointer or some facsimile of the pointer icon is displayed to indicate the active pointer position. A further aid is the activation of a textual display 122 near the selection region. This activation may be through a second button on the controller, by a more  
15 extreme motion of the pointer beyond the edge of the display, by a series of passes of the pointer over the selection region, or any similar kind of action by the user.

It should be noted that any of the pointing means discussed herein may be employed to enable a user of a control unit during a presentation to activate slide specific actions such as following a hot link to jump to another slide in the presentation.

20 While the above invention for providing the display of previewed images is described in the context of controlling a portable storage device, it may be more generally applied to the control of any form of electronic presentation having sequenced images where the presenter has a private display capable of showing different material from what the presenter's audience sees.

25 A possible product name for one embodiment using a laptop computer is VioPrompter.<sup>TM</sup> In this embodiment, a laptop computer is configured so that the laptop's LCD display shows preview display (e.g., to a presenter) independent of the generated image to be exported to an external display for viewing by an audience. This external display may be generated by the addition of a PCMCIA video card to generate video sent to public  
30 display. Laptop screen used for preview of slides. Controls on laptop or on a separate control unit as described above allow previewing slides on a laptop screen, or alternatively a LCD monitor, then transferring selected slides to the public display. Another embodiment of this invention employs control unit 91 of Fig. 6 with slide preview capabilities uses an interface box that communicates by wireless means with the remote control unit and by a



standard interface such as a USB connection. The interface box includes hardware, software, and/ or a combination thereof to enable a control unit according to the present invention to preview images of a presentation,. Thus, a traditional laptop computing device coupled with the interface box provides for generation of the images for presentation.

5           Although the invention has been described in the specification with reference to specific exemplary embodiments without limitation, it will be appreciated by those having ordinary skill in the art that the intended scope of the invention is intended to cover all modifications and equivalents within the scope of the appended claims.

WHAT IS CLAIMED IS:

- 1                   1.       A method for displaying a sequence of at least one image to an  
2 audience using a portable storage device electrically coupled to a display device, wherein said  
3 portable storage device includes a database to store said sequence of said at least one image  
4 and a control module to provide said sequence of images to said display device, wherein said  
5 method includes a user interface executing on a control unit operated by a human user, where  
6 said control unit executing said user interface includes a processor coupled to a memory,  
7 wherein said processor is further coupled to said user interface, one or more user inputs, and a  
8 communication module, said method comprising:  
9                   coupling said control unit to said portable storage device;  
10                  transferring a replica of said at least one images from said portable storage  
11 device to said control unit;  
12                  associating said replica with said at least one image;  
13                  presenting to said user a plurality of selections, where said selections include  
14 said replica;  
15                  accepting a user input to select said replica;  
16                  communicating said selection of said replica;  
17                  accessing said database to retrieve a selected image associated with said  
18 selected replica; and  
19                  outputting to said device display said selected image for audience viewing.
- 1                   2.       The method of claim 1 wherein each of said replicas are designed to  
2 include less data representing said replica than said image.
- 1                   3.       The method of claim 1, further comprising enhancing said replica to  
2 improve its distinctiveness in a low-resolution display.
- 1                   4.       The method of claim 3, wherein enhancing comprises filtering said  
2 replica with a band-pass or low-pass filter
- 1                   5.       The method of claim 1, wherein accepting said user input includes  
2 touching a panel or said user interface.
- 1                   6.       The method of claim 1, wherein accepting said user input includes  
2 recognizing a verbal command.

1                   7.       The method of claim 1, wherein accepting the user input to select said  
2 replica includes pointing to the replica responsive to the relative motion of said remote  
3 control.

1                   8.       A portable storage device for presenting one or more images to an  
2 audience, where said portable storage device is coupled to a display device and is configured  
3 to respond to a command transmitted by a control unit, said portable storage device  
4 comprising:

5                   a communication sensor configured to receive said command;  
6                   a communication controller electrically coupled to said sensor;  
7                   a memory having a data structure for storing image files;  
8                   a control module coupled to said communication controller and said memory,  
9 said control module configured to access said images files responsive to said command; and  
10                  a video output generator coupled to said memory to receive said image files  
11 and configured to provide said one or more images from said image files to said display  
12 device.

1                   9.       The portable storage device of claim 8, further comprising an image  
2 interface configured to receive image data from a personal computer used to generate said  
3 one or more images.

1                   10.      The portable storage device of claim 9, wherein said image interface  
2 includes a video input digitizer to accept analog signals.

1                   11.      The portable storage device of claim 9, wherein said image interface  
2 includes a digital interface to accept digital signals.

1                   12.      The portable storage device of claim 8, further comprising a docking  
2 port whereby said control unit is connected to synchronize a state of said control unit,  
3 wherein the state of said remote control unit links at least one or more images to be displayed  
4 on the device display with a replica of the one or more images.

1                   13.      The portable storage device of claim 8, wherein said images files  
2 include one or more compressed images.

1                   14.     The portable storage device of claim 13, wherein said video output  
2 generator further comprises a decompression module to decompress said one or more  
3 compressed images prior to transfer to said display device.

1                   15.     The portable storage device of claim 8, wherein said image file is a  
2 compiled PowerPoint presentation file.

1                   16.     The portable storage device of claim 8, wherein the memory is  
2 removable.

1                   17.     The portable storage device of claim 8, wherein the portable device is a  
2 digital camera.

1                   18.     The portable storage device of claim 17, wherein the digital camera  
2 further comprises:  
3                   a video output generator configured to provide video in XGA format; and  
4                   a presentation module,  
5                   wherein the presentation module controls the video output controller  
6 responsive to said command.

1                   19.     The portable storage device of claim 8, wherein the portable device is a  
2 digital VCR.

1                   20.     A method for providing electronic presentations, comprising:  
2                   producing a plurality of images on a computer;  
3                   transferring copies of said plurality of images into a database on a portable  
4 storage device;  
5                   configuring said portable storage device to exchange image data with a display  
6 device;  
7                   using a control unit to enter a user input;  
8                   generating a command from the entered user input;  
9                   receiving said command;  
10                  generating a display image from image data said portable storage device in  
11 response to said command; and

12.                    sending said display image to said display device as a video signal causing  
13 said display image to be presented to an audience.

1                    21.     The method of claim 20, wherein said transferring is done by digitizing  
2 an analog video signal from said computer.

1                    22.     The method of claim 21, wherein said analog video is one of VGA or  
2 XGA format.

1                    23.     The method of claim 20, wherein said transferring is done by using a  
2 digital interface selected from the group comprising a parallel port, a serial port, a USB port,  
3 an IR port, and a Firewire port.

1                    24.     The method of claim 20, wherein said connecting uses a VGA or XGA  
2 video format.

1                    25.     The method of claim 20, wherein said configuring said portable  
2 storage device includes selecting said display device from a group comprising a video  
3 projector, a video monitor, and a video display panel.

1                    26.     The method of claim 20, wherein said receiving is done by selecting a  
2 communications means from the group comprising a direct wire connection, radio signals,  
3 acoustical signals, and infrared signals.

1                    27.     The method of claim 26, further comprising attaching to said portable  
2 storage device for storage or operation as a combined device.

1                    28.     The method of claim 20 wherein generating the command further  
2 comprises:  
3                    executing a user interface on said control unit;  
4                    presenting to the user with the user interface a preview of a collection of one  
5 or more replica images associated with said plurality of images, where said one or more  
6 replica images are presented to the user at reduced size; and  
7                    pointing a next replica image to select a next image to display the audience for  
8 viewing.

1                   29.     The method of claim 30, further comprising enhancing said replica  
2 images to improve the distinctiveness of the replica images in a low-resolution display.

1                   30.     The method of claim 29, wherein said enhancing is done by filtering  
2 with one of a band-pass or low-pass filter.

1                   31.     The method of claim 20, further comprising pointing to an object of  
2 the generated display comprising:  
3                   measuring the relative motion of said remote control;  
4                   transmitting information derived from said measuring to the portable storage  
5 device;  
6                   adding a pointer icon to the generated display;  
7                   moving said pointer icon over the generated display in response to said  
8 information.

1                   32.     The method of claim 31, wherein said measuring relative motion  
2 includes sensing inertial change.

1                   33.     The method of claim 31, wherein said moving said pointer icon  
2 includes limiting the motion of the pointer icon to an area of the generated display.

1                   34.     The method of claim 31, wherein moving said pointer icon includes  
2 changing the appearance of the pointer icon when it reaches a border of the display.

1                   35.     The method of claim 31, wherein moving said pointer icon includes  
2 allowing motion of the icon only when an activation button is depressed on the remote  
3 control.

1                   36.     The method of claim 31, wherein moving said pointer icon includes  
2 smoothing said pointer to attenuate the display of hand tremor.

1                   37.     The method of claim 31, wherein moving said pointer icon includes  
2 using a gain means to attenuate the display of hand tremor.

1                   38.     The method of claim 35, wherein said pointer icon is only visible when  
2 said activation button is depressed.

1                   39.     The method of claim 31, wherein the location of the pointer icon on the  
2 display affects the behavior of control buttons on the remote control.

1                   40.     The method of claim 32, further comprising defining a plurality of  
2 regions on the generated display to each have different behaviors for a button on the remote  
3 control unit.

1                   41.     The method of claim 40, wherein defining said plurality of regions  
2 includes spacing said regions around the edges of the generated display.

1                   42.     The method of claim 40, wherein said defining includes highlighting a  
2 region when the pointer icon is proximal to it.

1                   43.     The method of claim 42, further comprises annotating the function of  
2 said highlighted region.

1                   44.     The method of claim 20, wherein said generating a display image  
2 further comprises the step of decompressing a compressed stored image.

1                   45.     The method of claim 20, wherein said portable storage device is a  
2 digital camera.

1                   46.     The method of claim 20, wherein said plurality of images includes  
2 video sequences.

1                   47.     The method of claim 46, wherein said video sequences are transition  
2 animations from one static slide to another.

1                   48.     The method of claim 46, wherein said video sequences are video clips  
2 inserted into the presentation.

1                   49.     The method of claim 20, wherein said step of generating a display  
2 image includes playing back a sequence of video frames.

1                   50.     The method of claim 49, wherein said playing back includes  
2 continuing said playing back to a next static display.

1                   51.     The method of claim 50, wherein said playing back comprises  
2     detecting a static display at the time said plurality of images is produced on a computer.

1                   52.     The method of claim 51, wherein said detecting comprises:  
2                   combining criteria of no significant change of the displayed pixels associated  
3     with one image to a next image; and  
4                   determining no significant change to the displayed pixels is maintained for a  
5     predetermined period of time.

1                   53.     A system for giving electronic presentations comprising:  
2                   a public display means;  
3                   a preview display means distinct from said public display means; and  
4                   a controlling means that allows selection of images shown on said preview and  
5     said public displays,  
6                   wherein said public display means is viewable to an audience,  
7                   wherein said preview means is viewable to a presenter.

1                   54.     The system of claim 53 wherein said controlling means and said  
2     preview display are combined in a handheld device.

1                   55.     The handheld device of claim 54 further includes a storage means for  
2     maintaining a plurality of preview images.

1                   56.     The handheld device of claim 54 further includes a pointing means for  
2     directing a pointer on said public display.

1                   57.     The handheld device of claim 54 wherein said controlling means  
2     include buttons for advancing or reversing said preview and said public displays over a  
3     plurality of presentation images organized in a serial order.

1                   58.     The handheld device of claim 54 further comprising a communications  
2     means for sending commands to said public display means.

1                   59.     The system of claim 53 wherein said public display means further  
2     comprises a public display storage means for maintaining a plurality of presentation images  
3     organized in a serial order.



1           60.   The system of claim 59 wherein said public display means includes a  
2 laptop computer.

1           61.   The system of claim 59 wherein said public display means includes a  
2 portable storage device comprising a portable storage device storage means, a display  
3 generation means, a portable storage device control means, and a communications means to  
4 communicate with a handheld device.

1           62.   A system for giving electronic presentations comprising:

2           a display generations means comprising:

3                           a storage means encoding a plurality of presentation

4                           images;

5                           a display control means;

6                           a video output generation means,

7                           whereby said output video is intended to drive a display

8                           means suitable for viewing by an audience; and

9                           a first communications means; and

10          a remote control means comprising:

11                           a storage means for encoding a plurality of preview

12                           images corresponding to said plurality of presentation images;

13                           a preview display means allowing a user to see one or  
14                           more of said preview images prior to or simultaneous with the display  
15                           of a corresponding one of said presentation images to an audience by  
16                           means of said display generation means;

17                           a mechanical input means to allow said user to specify  
18                           the display of said preview images and said presentation images; and

19                           a second communications means capable of transmitting  
20                           data to said first communications means thereby allowing said remote  
21                           control to influence the operation of said display generation means.

1           63.   The system of claim 62, wherein said remote control comprises a palm  
2 computer having a touch panel and hardware to show said preview images on said palm  
3 computer's display and said mechanical input means includes the input controls of the palm  
4 computer.

1                   64.     The system of claim 63 wherein the touch panel of said palm computer  
2 is used to control the display of a pointer on said display means wherein the pointer can be  
3 made to appear and move on said display means by the actuation of a stylus on said touch  
4 panel.

1                   65.     The system of claim 63 wherein the display generation means further  
2 comprises a docking port whereby said palm computer can be connected to synchronize a  
3 state of said remote control with said display generation means, wherein at least one state  
4 includes associating at least one preview images with at least one presentation image.

1                   66.     The system of claim 63 wherein the display generation means further  
2 comprises a docking port whereby said palm computer can be connected for transferring said  
3 plurality of preview images to said remote control means.

1                   67.     The system of claim 63 wherein the display generation means further  
2 comprises a docking port whereby said palm computer can be connected for transferring said  
3 plurality of presentation images to said display generation means.

1                   68.     The system of claim 63 wherein a macro programming capability is  
2 provided whereby a user can automate the playback and control of said presentation images.

1                   69.     The system of claim 62 wherein an identifier is shared by said remote  
2 control means and said display generation means whereby signals from a second remote  
3 control means or a second display generation means will not interfere with the  
4 communication between said remote control means and said display generation means.

1                   70.     The system of claim 63 wherein said hardware includes a plug-in  
2 module comprising a storage means, a control means, and a wireless communications means.

1                   71.     The system of claim 63 further comprising a compiler that generates  
2 said preview display images from said presentation images wherein said compiler adapts the  
3 format of said preview images according to the properties of said palm computer.

1                   72.     The system of claim 63 wherein said hardware includes a plug-in  
2 module comprising the functions of said display generation means.

- 1                    73.    The system of claim 63 further comprising a compiler that converts a  
2   PowerPoint presentation file into a data file comprising an encoding of said display images  
3   and an encoding of said preview images.

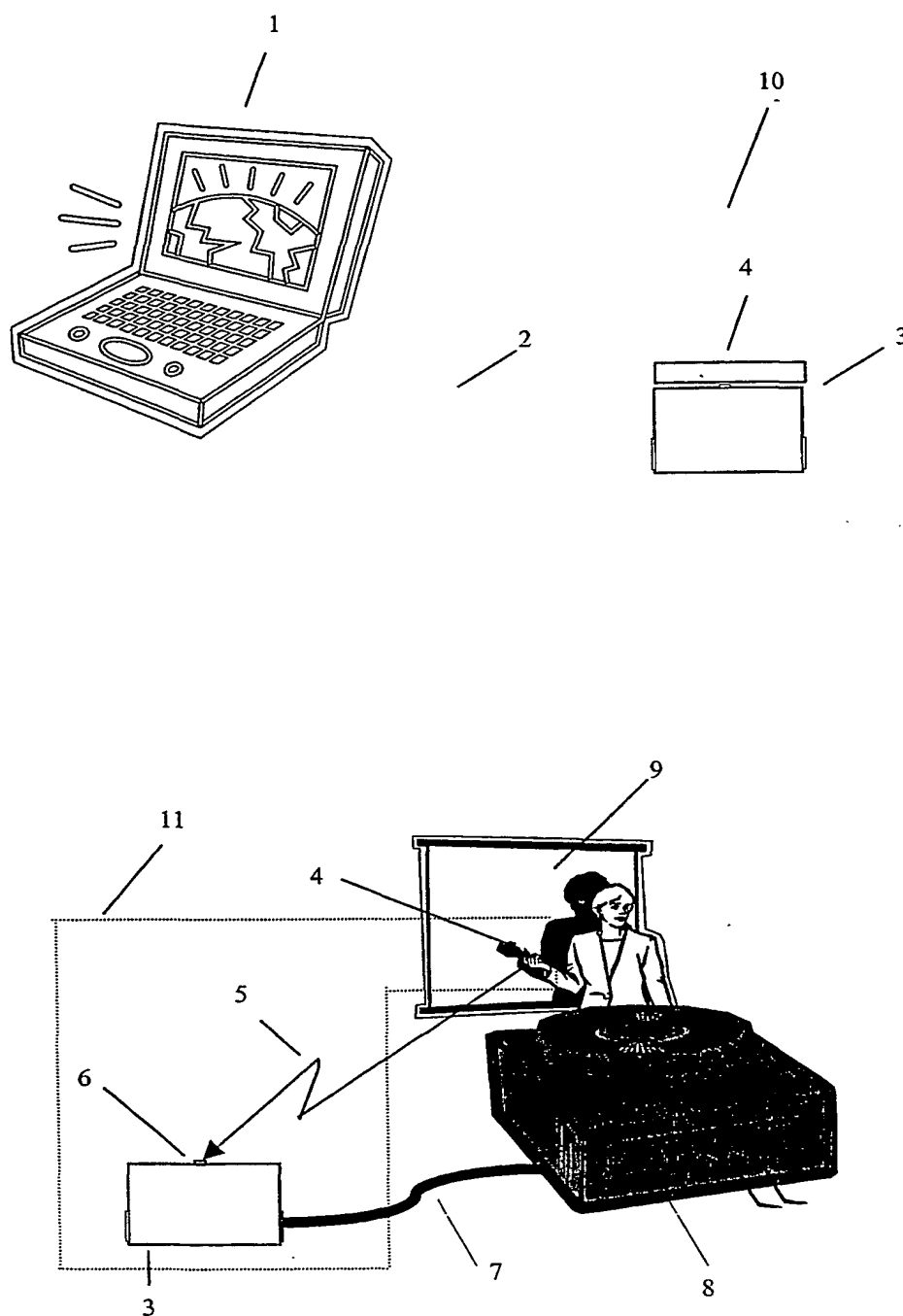


FIG. 1

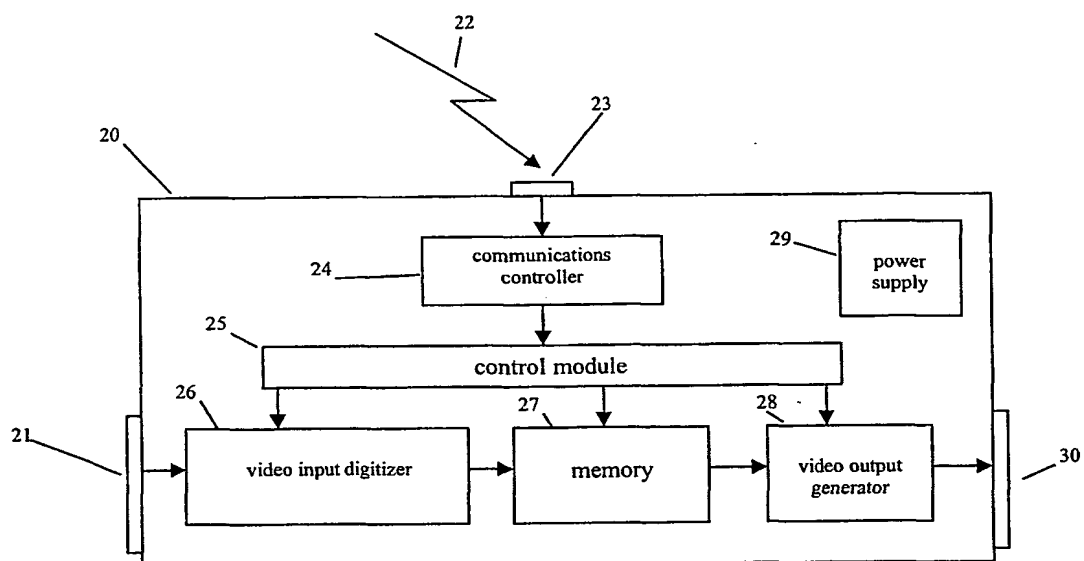


Figure 2

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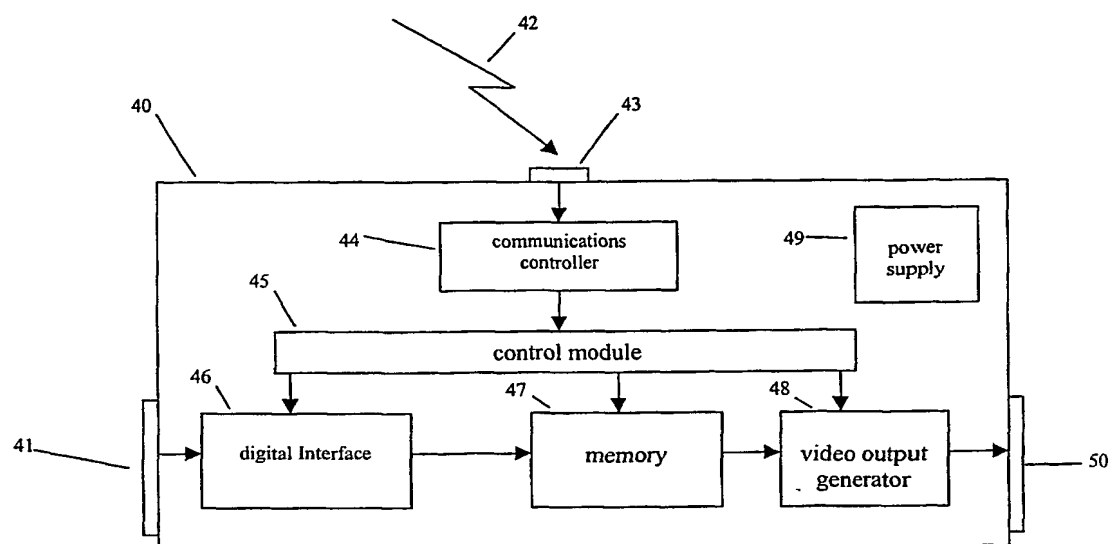


Figure 3

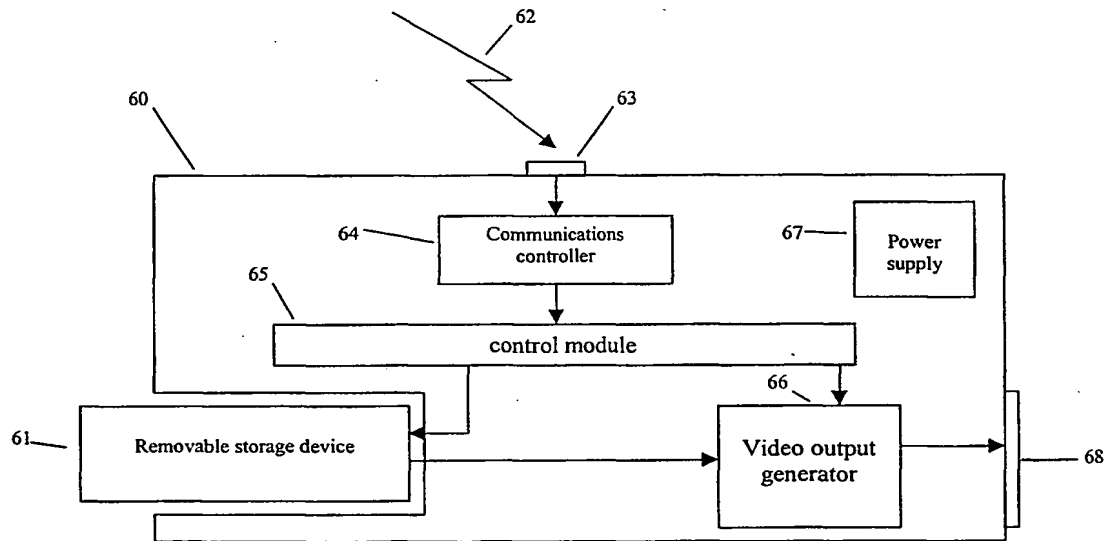


Figure 4

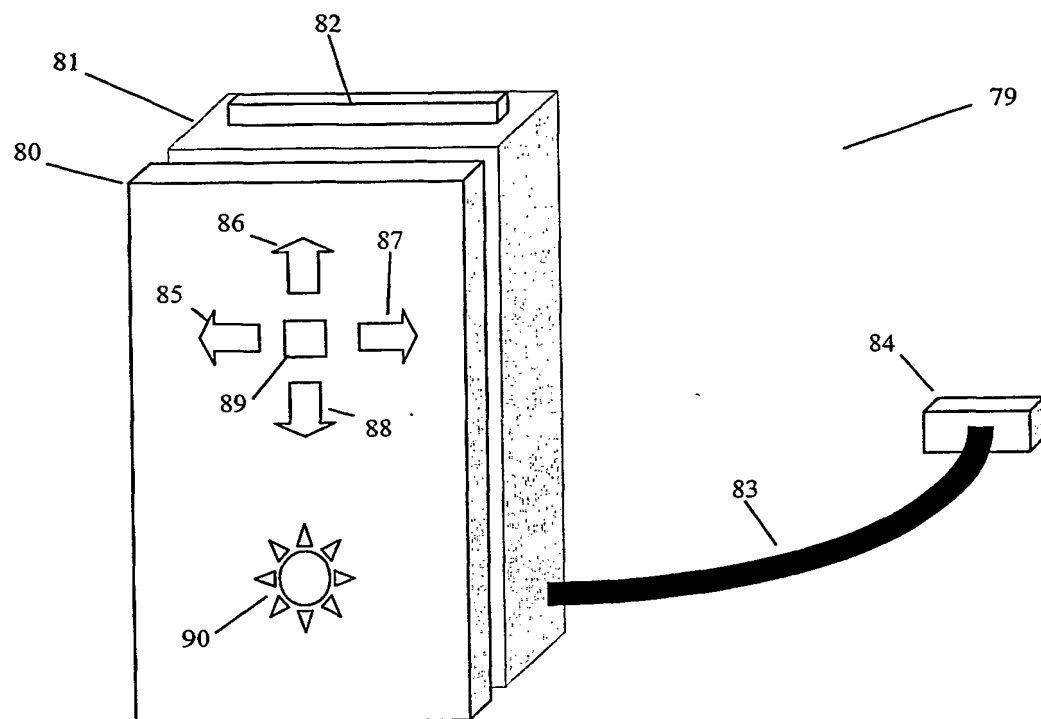


Figure 5



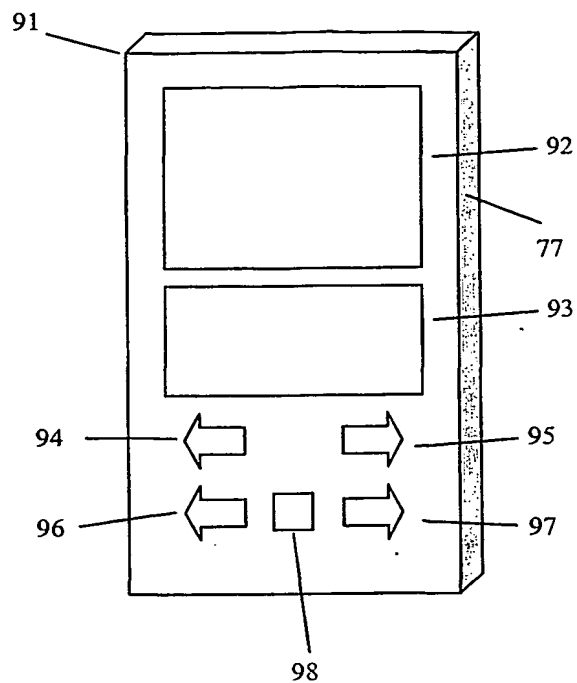


Figure 6

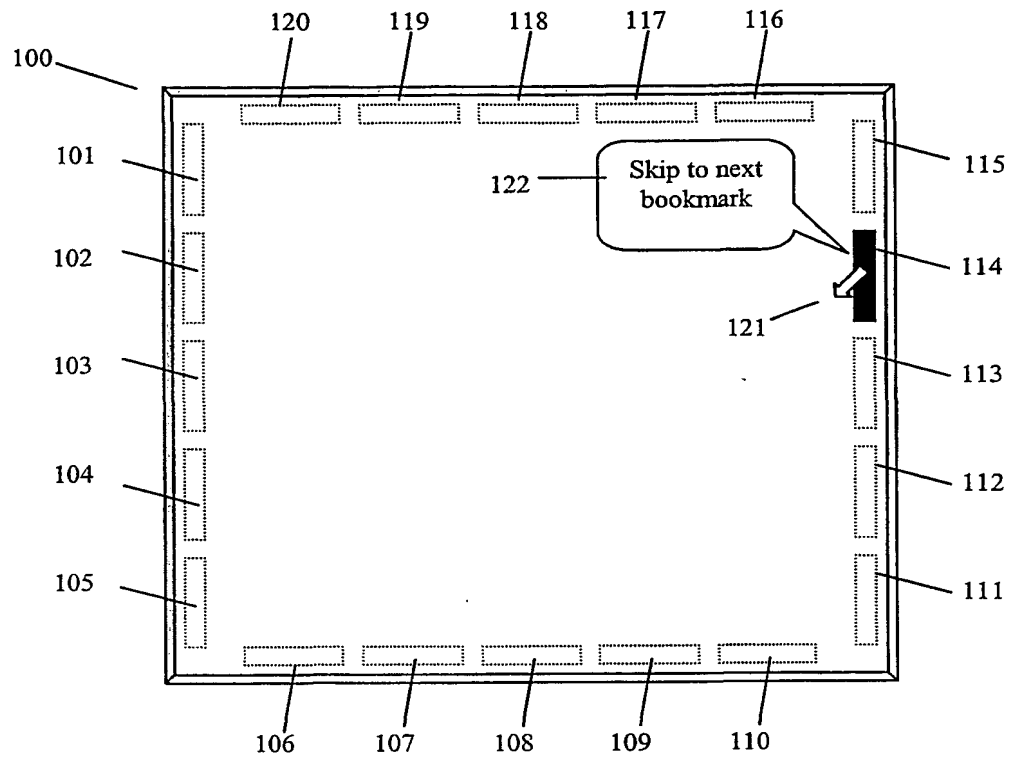


Figure 7

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US01/20497**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(7) :G09G 5/00

US CL :345/2.2,169

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 345/2.2,169

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EAST 1.08

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,859,623 A (MEYN et al.) 12 January 1999, col. 1, line 63-col. 2, line 26, col. 4, line 20-col. 5, line 3, col. 6, lines 32-50, col. 10, line 49-col. 11, line 36, col. 18, line 6-col. 19, line 22, col. 22, lines 39-68, and col. 26, lines 40-55.	1-73
Y	US 5,798,785 A (HENDRICKS et al.) 25 August 1998, col. 4, line 60-col. 6, line 52, col. 8, line 34-col. 9, line 18, col. 10, line 64-col. 12, line 2, col. 13, line 33-col. 14, line 68, col. 16, lines 25-38, and col. 19, lines 29-65.	1-73



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier document published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

Date of the actual completion of the international search

07 SEPTEMBER 2001

Date of mailing of the international search report

18 OCT 2001

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